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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,631	08/05/2003	Ralph L. Carlson	RCARL-001-US	7208

45464 7590 12/14/2006

JACOBS & KIM LLP
1050 WINTER STREET
SUITE 1000, #1082
WALTHAM, MA 02451-1401

EXAMINER

BLOOM, NATHAN J

ART UNIT	PAPER NUMBER
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2112

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,631

Applicant(s)

CARLSON, RALPH L.

Examiner

Nathan Bloom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☒ Claim(s) 1,2,4-7,10,23,25,28 and 31 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/29/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. Please see information below regarding content of specification and in particular the requirements for the abstract.

Content of Specification

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).
- (e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.
- (f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

- (g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.
- (h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

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- (l) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

2. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

3. The abstract of the disclosure is objected to because it greatly exceeds the maximum allowed length of 150 words. Correction is required. See MPEP § 608.01(b).

4. The use of the trademarks TOP-FLITE and TITLEIST have been noted in this application. They should be capitalized wherever they appear and be accompanied by the generic terminology.

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Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner, which might adversely affect their validity as trademarks.

5. The disclosure is objected to because of the following informalities: line 1 of page 10 contains the misspelled term “TS2” which is believed to read “ST2” referring to the first orienting station. Appropriate correction is required.

Claim Numbering

6. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Original claims 29 (the 2nd one), and 30-32 have been renumbered 30-33 respectively.

Claim Objections

7. Claims 1, 7, 10, 23, and 25 are objected to because of the following informalities: for example the final line of claim 1 states “is prepositioned for further processing” should read “is positioned for further processing” because preposition has a different meaning than is intended. This language also exists in line 14 (page 27) of claim 7, line 28 (page 28) of claim 10, line 17 (page 32) of claim 23, line 26 (page 32) of claim 25, and line 24 (page 33) of claim 25.

Appropriate correction is required.

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8. Claims 2, 10, and 25 are being objected to because of the following informalities: for example the final line of claim 2 states "to determine the predetermined angles for" these angles are not already known thus it should read "to determine the angles for". This language also exists in line 24 (page 28) of claim 10, line 30 (page 32) of claim 25. Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 6 recites the limitation "imaging system" and "imaging means" in the 1st two lines of claim 6. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination claim 6 will be considered dependent on claim 2, which is the first appearance of the term "imaging system" in the claims.

11. Claim 31 recites the limitation "single imaging means" in the 1st line of the claim. The system of claim 29 that claim 31 is dependent upon clearly has 2 imaging means. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination the claim will be read as dependent on claim 30, which is the first of the claims dependent on claim 27 to mention a single imaging means.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Mitoma (US 5611723).

Instant claim 1 encompasses a system for automatically orienting a spherical object using a reference indicium on the spherical object. The system is comprised of a means for automatically locating and defining a position and two-dimensional orientation of the reference indicium and then a means for automatically orienting the spherical object from its defined original position to a predetermined final position. The automatic orienting means sequentially rotates the spherical object from the defined position through predetermined angles so that the reference indicium arrives at a predetermined final position and two-dimensional orientation wherein a target point on the spherical object is pre-positioned for further processing. In other words, the spherical object is automatically oriented from its original position to a predetermined final position. Mitoma teaches in lines 34 –67 of column 1, column 2, and lines 1-45 of column 3 a system that identifies an indicium (burrs on the golf ball) using the automatic locating means and then automatically orients a ball so that the indicium (burrs on the golf ball) is at predetermined position for further processing.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1, 2, 4, 5-10, 12, 14, 19-21, 23, 25, 27-29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitoma (US 5611723).

Instant claim 2 limits the system of claim 1 with the additional limitations that the locating and defining means are comprised of a 1st and 2nd locating work station, a transposing means, an imaging system, and calculating means. The 1st and 2nd locating work stations each capable of rotating the spherical object about the axis of rotation. The transposing means conveys the spherical object between the work stations and the orienting means in such a manner that the spherical object is rotated 90 degrees between each. The imaging system generates an image of the spherical object at the 1st and 2nd locating work stations as it is rotated at least one revolution about the axis of rotation at each locating work station. The calculating means processes the image of the spherical object generated at the locating work stations to locate and identify the defined position and 2-D orientation of the reference indicium and then calculate the angles of rotation to be completed by the orientation means. Furthermore, instant claim 4 limits the system of claim 2 with the additional limitation that the 90-degree rotation of the spherical object by the transposing means in-between stations is coplanar with the axis of rotation of the 1st and 2nd locating stations. Mitoma in Figure 1, lines 34 -67 of column 1, all of column 2, and lines 1-45 of column 3 teaches the system of claim 1 with the additional limitations of a 1st and 2nd locating work stations capable of rotating the sphere about an axis of rotation. In particular, as can be seen in figure 1 and is described in lines 58+ of column 1 and lines 1-10 of column 2, the 1st locating work station rotates the sphere about its vertical axis and the 2nd work station

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rotates the sphere about its horizontal axis. This is equivalent to the system claimed by the applicant, which rotates the sphere about the vertical and then the horizontal axis by applying a 90-degree rotation (done by the transposing means) in-between the two locating work stations. This 90-degree rotation is coplanar with the axis of rotation of the 1st and 2nd locating stations. This is equivalent because the end effect of the process is that the sphere is being rotated about 2 perpendicular axes thus allowing full imaging of the sphere's surface at the 2 location work stations. Mitoma also describes in lines 28-32 of column 2 a transposing means which takes the spherical object from station to station, and imaging system in lines 58+ of column 1 and lines 1-10 of column 2 which images the spherical object at the 2 locating work stations, and a calculating means in lines 58+ of column 1 and lines 1-10/33-39 of column 2 for processing the image of the spherical object generated by the imaging means then identifying the reference indicium and providing the angles of rotation to obtain the desired final orientation.

Instant claim 5 limits the system of claim 2 with the additional limitations that each locating work station has an imaging means that has an image axis perpendicular to the spherical object at the locating work station. The placement and orientation of the imaging means can be seen in figure 1 of Mitoma where the imaging axis of the imaging means at both stations are aligned such that they are directed at the center of the spherical object, and the height of the imaging means is taught in lines 54+ of column 4 to be the same height as the spherical object (golf ball). In figure 21 it can be seen that imaging axis of imaging means C is shown to be perpendicular to the surface and vertical axis of the spherical object.

Instant claim 7 limits the system of claim 1 with the additional limitation that the orienting means is composed of three orienting work stations and a transposing means to convey

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the spherical object between each. The 1st, 2nd, and 3rd orienting work stations each have an axis of rotations operative to sequentially rotate the spherical object through one of the predetermined angles so that the reference indicium is at the predetermined final position at the 3rd orient station. The transposing means operates in the same manner as the transposing means for the locating work stations in that it rotates the sphere 90 degrees between each of the orienting work stations. Mitoma discloses, in lines 42+ of column 5, a series of 3 orienting stations, which sequentially rotate the spherical object to its desired final position. However, Mitoma does not disclose the rotation of the spherical object by the transposing means. This is discussed in the previous argument for the system of claim 2 as being functionally equivalent to using a series of work stations that rotate the spherical object in such a manner that each station is rotating about an axis that is 90 degrees different than the previous station. As can be seen in Fig. 1 and as is further disclosed in the description provided by Mitoma each of the work stations has an axis of rotation that is 90 degrees different than the one preceding it thus providing the same effect as rotating it using the conveying means as described by the applicant.

Instant claim 8 limits the system of claim 7 with the additional limitation that the transposing means is comprised of two transposing mechanisms pivotally mounted to convey the spherical object between the 1st and 2nd, and the 2nd and 3rd orienting work stations in such a manner that the spherical object is rotated through the single degree of freedom by 90 degrees. Additionally, the transposing mechanisms include a mechanical gripper. Mitoma teaches in lines 28-32 of column 2 a mechanism for transposing the spherical object between stations using a conveyance arm as can be seen in figure 6. The series of conveyance arms uses adsorption cups to lift/place the spherical object from/to each station. This system of conveyance is functionally

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equivalent to the use of a pivotal gripper type mechanical arm since they both achieve the function of moving the spherical object from station to station in much the same manner.

Furthermore, the conveyance arms as taught by Mitoma do not rotate the spherical object by 90-degrees but this system limitation has been previously discussed (see the rejection of instant claim 2) and is not a necessary step for the transposing means as taught by Mitoma.

Instant claim 9 limits the system of claim 7 with the additional limitation that the 90-degree rotation of the spherical object in-between stations is coplanar with the rotational axis of the work stations. As per the rejection of instant claim 4 Mitoma discloses this additional limitation.

Instant claim 10 encompasses a system for automatically orienting a spherical object based on the position of a reference indicium comprising 2 locating work stations, 3 orienting work stations, transposing means, imaging system, and calculating means. Instant claim 12 adds the additional limitation that the 1st and 2nd locating work station each have a corresponding imaging means with an imaging axis perpendicular to the spherical object. Instant claim 14 encompasses the system of claim 10 with the additional limitation that the 90-degree rotation of the spherical object in-between stations is coplanar with the axes of rotation of the work stations. As per the rejection of instant claims 1, 2, 4, 5, and 7 Mitoma teaches the system and its additional limitations as described in instant claims 10, 12, and 14.

Instant claim 19 limits the system of claim 10 with the additional limitation that each station has a means for holding the sphere at each station and a means for rotating the spherical object about the corresponding axis of rotation. The means for holding is a bottom cup that holds the sphere in combination with the engaging means. Instant claim 20 includes the

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additional limitation that the engaging means with the bottom comprises a vacuum. Mitoma teaches in lines 54+ of column 4 and lines 1-9 of column 5 a means for holding and engaging the spherical object which as well as rotating the cup and engaging means about the corresponding axis of rotation. In particular, Mitoma teaches a bottom cup with a vacuuming means (engaging means) to suction the spherical object to the cup for holding. This cup and engaging means are then used to rotate the spherical object about its vertical axis. This applies to the 1st locating work station as well as the 1st and 3rd orienting stations. For the 2nd locating work station and the 2nd orienting work station Mitoma teaches a set of horizontal cups using the vacuuming effect to suction the spherical object to the cups. This holding means and spherical object are then rotated about the horizontal axis, which corresponds to the axis of rotation used at the station. The use of the bottom cup with the vacuum provides the station with the ability to rotate the spherical object such that the station can carry out its function, which is to rotate the spherical object in a specific direction. The use of the horizontal work stations has been shown to be equivalent and thus the use of (horizontal) side cups and engaging means is analogous to that of the vertical station and thus these side cups are functionally equivalent to the bottom cups of the vertical work stations.

Instant claim 21 limits the system of claim 19 with the additional limitation that the engaging means is an opposing cup that upon engagement holds the spherical object in combination with the bottom cup. This limitation is functionally equivalent to the vacuum system as used by Mitoma. Also, the use of an opposing cup as an engaging means is taught in Mitoma in lines 10-29 of column 5 that two opposing side cups can be used to engage and rotate the spherical object. However, Mitoma does not teach the use of opposing cups as an engaging

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means in a vertical orientation. As was discussed earlier it would be obvious to one skilled in the art that one could rotate the sphere about its horizontal axis instead of the vertical axis using a horizontally oriented station as opposed to as vertically oriented station. It would be obvious to one skilled in the art that these (horizontal) opposing side cups taught by Mitoma can be placed in a vertical manner and still be used as engaging means for the rotation of the spherical object.

Instant claim 23 limits the system of claim 10 with additional limitations to the orientation means. The three orienting stations are operative in sequentially rotating the spherical object about the angles determined by the calculating means. The sequential rotation of the sphere occurs in a manner such that the 1st station rotates the sphere such that the reference indicium is at a predetermined position and then is transferred via the transposing means to the 2nd orienting station which rotates the sphere a predetermined angle about its axis such that the reference indicium is at another predetermined position. The same process occurs for the 3rd station at which point the reference indicium is at the predetermined final position. Instant claim 24 places the additional limitation that the 1st, 2nd, and 3rd orienting stations each rotate the sphere about a different axis. Mitoma teaches in lines 42+ of column 5 and lines 1-4 of column 6 that the spherical object is sequentially rotated through the predetermined angles such that at the third orienting station the spherical object is in a predetermined orientation. Mitoma also teaches that the position of the indicium will be placed in a particular orientation at each station. Furthermore, Mitoma teaches the method of orienting the spherical object by rotating the sphere about its horizontal (X), vertical (Y), and then horizontal (X) axis. This is known by one of ordinary skill in the art to be equivalent to rotating the spherical object about each of the 3 Euler angles that are typically defined as rotations about the XYZ coordinate axes.

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Instant claim 25 encompasses the method for automatically orienting a spherical object using a reference indicium on the spherical object. The method is comprised of the following steps: locating and defining the 2-D orientation of the reference indicium on the spherical object, calculated based on the defined position a series of angles of rotation for the spherical object to orient the reference indicium from the defined position to a predetermined final position, rotating the sphere at a 1st orienting work station to a defined position and then transferring while rotating it 90-degrees to a 2nd orienting work station, rotating the spherical object to a defined position at the 2nd orienting work station to a defined position and then transferring while rotating it 90-degrees to a 3rd orienting work station, rotating the spherical object to the final predetermined position at the 3rd orienting work station. Mitoma teaches the apparatus in lines 34+ of column 1 and lines 1-39 of column 2 that accomplishes the method as claimed in instant claim 25.

Additionally the rotation by 90-degrees as described by applicant is not covered, but as described in previous arguments Mitoma describes a functionally equivalent system. Therefore, Mitoma teaches the apparatus and the method for using it as described in claim 25.

Instant claim 27 encompasses a system for imaging the surface of a spherical object. This system is comprised of a 1st and 2nd locating work station to rotate the spherical object about the station's axis of rotation, and wherein a rotational plane is formed perpendicular to the spherical object's axis of rotation. The spherical object is conveyed from 1st to 2nd locating station via the transposing means which rotates the spherical object 90-degrees, this rotation is such that the rotational plane of the sphere at the 1st locating work station is perpendicular to that the rotational plane defined at the 2nd locating work station. The imaging system is positioned to generate a first and second image of the surface of the spherical object as it is rotated at least one

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complete revolution about its respective axis of rotation at the 1st and 2nd locating work station.

Mitoma teaches in lines 58+ of column 1 and 1-10 of column an imaging system which rotates a spherical object about an axis at the first station while imaging the surface of the spherical object then conveys it to the 2nd station which rotates it about a perpendicular axis while imaging the surface of the spherical object at the 2nd station. The function performed by Mitoma is identical to the function performed by the system described in instant claim 27 therefore they are functionally equivalent. Instant claim 28 adds the limitation that the system imaging means of system 27 have an imaging axis that is perpendicular to the spherical object at the respective stations. This limitation has been addressed per rejection of instant claim 5.

Instant claim 29 limits the system of claim 28 with the additional limitation that the imaging means are line sensor cameras. A line sensor camera is a specific type of CCD camera, which has a fast scanning speed and is typically used in inspection systems. Since Mitoma teaches an inspection system that uses CCD cameras and it is known to one of ordinary skill in the art that a line sensor camera is preferred for use in inspection systems then it would be obvious to one of ordinary skill in the art to use a line sensor camera with the invention as taught by Mitoma.

Instant claim 32 limits the system of claim 27 with the additional limitation that the transposing means is comprised of a pivotally mounted transposing mechanism mounted between the 1st and 2nd work stations with a mechanical gripper capable of grasping the spherical object for transport between the 1st and 2nd work stations. Mitoma teaches this additional limitation as per the rejection of instant claim 8.

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16. Claims 27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitoma (US 5611723) in further view of Welchman (US 6630998 B1) and Petry (US 5859923 A).

Instant claim 33 encompasses the system of claim 27 with the additional limitation that there are means to convert the images to a virtual image, and there is electronically stored referenced data representing a standard graphical configuration of the spherical object's surface. The system has means to compare the virtual images to the stored image to detect any discrepancies between the virtual and stored images. Mitoma teaches the system of claim 27 as previously mentioned but does not teach the limitations of claim 33 for comparing the 1st and 2nd images to a reference image for discrepancies. However, Welchman discloses an apparatus and method for automated game ball (spherical object) inspection that teaches in lines 60+ of column 14 and lines 1-15 of column 15 that a method and means such as that described by Petry can be used for image analysis by comparing the images taken with those of a reference image. In lines 15+ of column 3 and lines 1-10 of column 4 Petry teaches the image analysis, pattern recognition, and position analysis based upon the comparison of the images. Therefore, Welchman in combination with Petry has already taught the means and method for comparing images to identify indicium for use in a game ball inspection system. It would be obvious to one of ordinary skill in the art to use this or any other technique capable of identifying the reference indicium on a spherical object for other game ball inspection systems such as that taught by Mitoma. Mitoma currently uses the captured images and a calculating unit with a set of rules, based on the type of indicia, for detecting and then determining the angles of rotation necessary to achieve the desired orientation of the spherical object. Given that these are equivalent in that they both detect the indicia then it would be obvious to one of ordinary skill in the art to use of

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the comparison technique taught by Welchman and Petry with the game ball inspection system of Mitoma given that the comparison technique is functionally equivalent to the locating means of Mitoma in that it identifies the indicia on the spherical object.

17. Claims 1, 6, 10, 13, 27, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitoma (US 5611723) in further view of White (US 4972494).

Instant claims 6, 13, and 30 further limit the systems of claims 1, 10, and 27 (respectively, in other words 6 further limits 1, 13 further limits 10, and 30 further limits 27) with the additional limitations that the imaging system is comprised of a single imaging means with two sets of mirrors. Each set of mirrors is placed such that a single set is aligned to capture the image of the spherical object at a single locating work station. In combination this camera and mirror system make up the imaging system, which is operative to generate the image of the spherical object at each work station. Thus the system uses a single imaging means to generate an image of the spherical object at each station by directing the images for each station to the single imaging means via a series of mirrors. It has been shown previously that Mitoma teaches the systems of claims 1, 10, and 27. However, Mitoma does not teach the use of mirrors to reduce the amount of imaging means (cameras) necessary to image the spherical object.

An optical inspection system taught by White uses several cameras to inspect various packages. Additionally, White teaches that a single camera can be used in conjunction with several mirrors placed to provide a view of the package to be inspected. Since Mitoma is also teaching a type of inspection system, and the applicant is inspecting and then based on this inspection orienting a spherical object based upon its inspection then it would be obvious to one

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of ordinary skilled in the art to combine these teachings to reduce the number of cameras necessary for the inspection system as described by Mitoma. Therefore, it would be obvious to one of ordinary skill in the art to reduce the multiple imaging means taught by Mitoma in further view of the single camera with a series of mirrors as taught by White in lines 18-23 of column 17

Instant claim 31 limits the system of claim 30 with the additional limitation that the imaging means is a line sensor camera. Mitoma teaches this limitation as per the rejection of instant claim 29.

18. Claims 1-3, 10, 11, 15-18, 22, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitoma (US 5611723) in further view of Gordon (US 5632205).

Instant claims 3, 22 limit the respective systems of claims 2, 10 (claim 3 further limits instant claim 2 which further limits instant claim 1, claim 22 further limits instant claim 10) with the additional limitations that the calculating means processes the image generated at the two locating work stations, the first locating station rotates the spherical object by the angle determined by the calculating means at the first locating station. The transposing means then conveys the spherical object to the second locating work station and rotates it by 90 degrees. The ability of a work station to perform both the locating and orienting functions is covered in the argument for claim 11 given below. The other limitations are included in the system of claim 11 and are shown below to have been taught by Gordon and Mitoma.

Instant claim 11 limits the system of claim 10 wherein the second locating work station is equal to and functions as first orienting work station. This means that the second locating work station rotates the spherical object to a defined position by rotating it through the first

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predetermined angle. Mitoma teaches the automatic orientation system as described in instant claim 10. However, Mitoma does not teach the locating work station that also operates as an orienting work station.

Gordon teaches a system for automatically orienting a spherical object based on a reference indicium. This system performs the same function as that of the applicant and Mitoma but goes about it in different way. Gordon teaches a system with a single station wherein the spherical object's reference indicium is located via the imaging means, the position and rotations are calculated while still at this station, and then the spherical object is rotated to the final predetermined position such that the spherical object is in position for further processing. Gordon does use a different structure for rotation, but the two systems are functionally equivalent and thus should be considered in the same field of endeavor. Given that Gordon teaches the combination of a locating and orientation station it would be obvious to one of ordinary skill in the art to combine an orienting station with a locating station in Mitoma's system thus reducing the total number of stations used. Therefore, Mitoma in further view of Gordon teaches the system of instant claim 11.

Instant claim 15 limits the system of claim 11 with the additional limitation that there are three transposing means each pivotally mounted and operative to convey the spherical object between work stations. Furthermore the transposing means provides the single degree of freedom 90-degree rotation. Instant claim 17 provides the additional limitation to 15 that transposing means has a mechanical gripper. Mitoma teaches a transposing means that covers all stations of the locating and orienting process thus the additional limitations described in instant claim 15 and 17 as per the rejection of instant claim 8. Mitoma has taught the function of the

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third transposing means for the same reasons that the first and second transposing means are taught by Mitoma.

Instant claim 16 limits the system of claim 15 with the additional limitation that the 90-degree rotation of the spherical object in-between stations is coplanar with the rotational axis of the work stations. As per rejection of instant claim 4 Mitoma has disclosed this additional limitation.

Instant claim 18 limits the system of claim 15 with the additional limitation that the transposing mechanisms are connected to a beam that is functionally connected to a motor means wherein the transport mechanisms pivoted through the 90-degrees single degree of freedom simultaneously. Mitoma teaches in lines 28-32 of column 2 and lines 6-28 of column 7 a transposing means for each station that move simultaneously between each station. This transposing means is connected to a single structure that is in turn connected to a motor means that provides the necessary function of moving the spherical object from station to station. This means does not provide the function of rotating the spherical object 90-degrees that is necessary in the applicants system, but Mitoma accomplishes this through functionally equivalent means explained in the rejection of instant claims 2 and 4. Thus it is obvious to one of ordinary skill in the art that the two systems are functionally equivalent.

Instant claim 26 limits the method of claim 25 with the additional limitations that the steps of locating and defining the dimensional orientation of the reference indicium on the sphere is comprised of: providing a spherical object of random orientation at the 1st locating station, imaging it at the 1st locating station, determining a coarse position and 2-D orientation of the reference indicium using the image, calculating the angle of rotation for the sphere at the 1st

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locating station, conveying the spherical object to the 2nd locating work station while providing a 90-degree rotation, imaging the spherical object at the 2nd locating work station, and then locating and defining the position of the reference indicium using the image generated at the 2nd locating work station. This method describes the function as performed by the system in lines 34+ of column 1 and lines 1-39 of column 2 that accomplishes the method as claimed in instant claim 26. Additionally, Mitoma and Gordon have taught the system as per the rejection for instant claims 3, 11, 15-18, and 22. In particular claims 3 and 22 show that Mitoma and Gordon teach the coarse orientation at the first locating station after the angle for rotation has been determined.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Thursday from 7:30 am to 5:00 pm (EST). The examiner can also be reached on alternate Fridays.

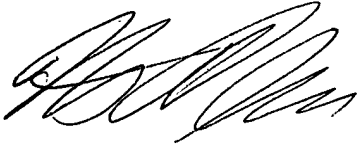
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Stucker, can be reached on 571-272-0911. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Nathan Bloom 11/30/2006



JEFFREY STUCKER
SUPERVISORY PATENT EXAMINER